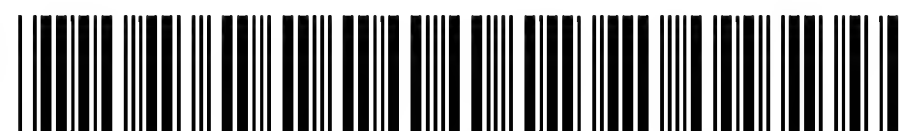


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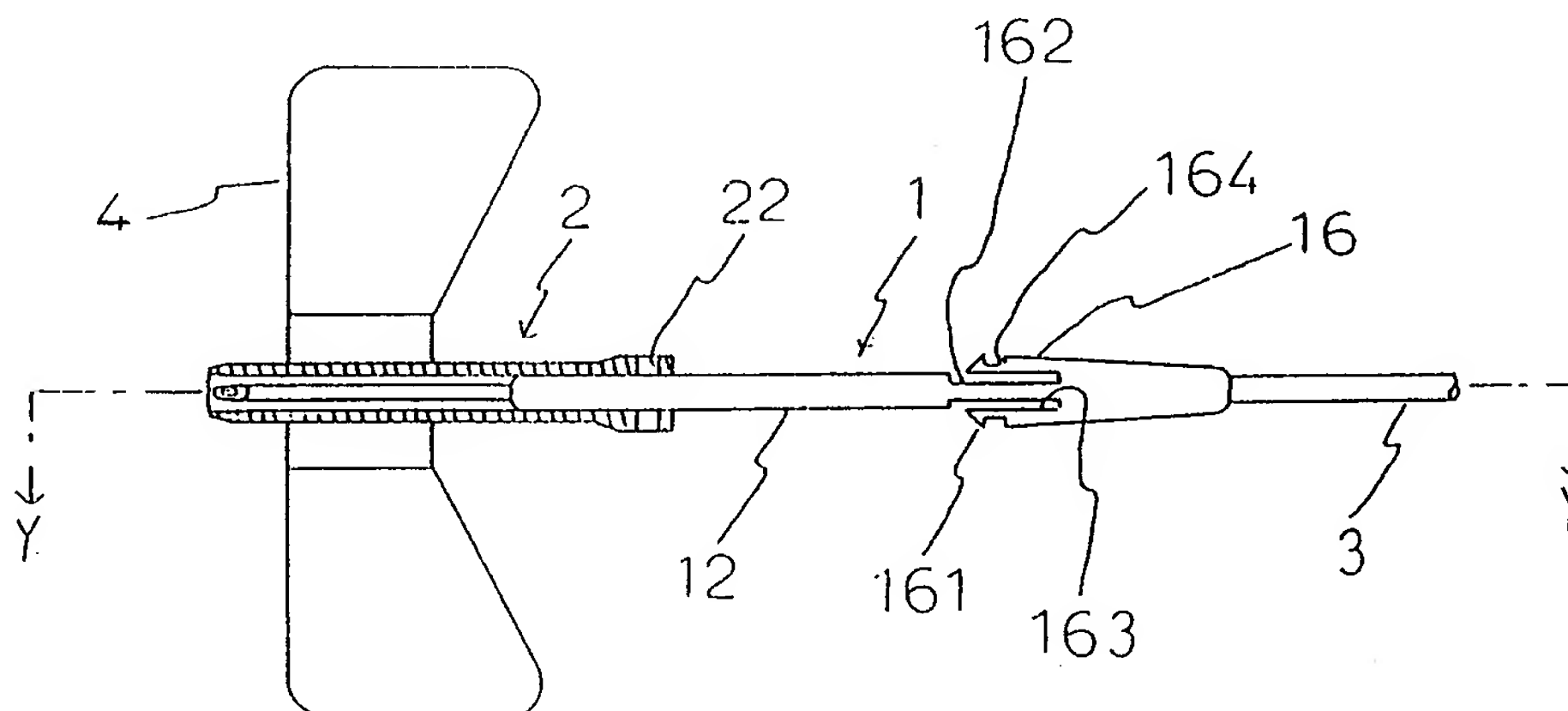
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**D-80539 München (DE)**(54) **An indwelling injector needle assembly having wings.**

(57) An indwelling injector needle assembly having wings, a cannula or needle body (11), a hub (12) supporting a proximal end of the needle body, a tubing (3) connected a proximal end of the hub, and a cylindrical holder (2) having a distal end from which the wings (4) protrude. The hub (12) can slide along an inner periphery of the holder, between a first position near the distal end and a second posi-

tion near a proximal end of the holder. A latching mechanism is formed in and disposed between the hub (12) and the holder (2) so that the hub is inhibited from moving from the first position towards the second position, and vice versa, such that its injector needle is allowed to slide in order to retract the needle's pricking edge into the cylindrical holder, while leaving its wings retained on a patient's skin.

FIG. 4



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## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

The present invention relates to the so-called indwelling injector needle having wings and a needle body, and more particularly to an injector needle held in a protector having the wings such that when the needle body slides into the protector after used, a needle edge is automatically retracted therein to protect a user from erroneously piercing his or her skin with the edge.

## 2. Description of the Prior Art

Usually, the conventional medical needles are separable from protective members designed to accommodate the needles. Users of those medical needles have erroneously pricked often their fingers with the edges of used needles, when the latter were restored in the protectors held by their fingers. Thus, there is and has been a possibility that the users might be infected with the adventitious immunity defection syndrome ( viz., AIDS ) or hepatitis. Some injector assemblies have been proposed or provided to prevent such accidents. For example, the United States Patent No. 5,120,320 discloses an injector assembly that comprises a protector integrally connected to an indwelling needle which has wing-shaped members. A used needle in this case is allowed to slide backward into the protector along a pair of guide slits formed longitudinally thereof so that the used needle's edge is hidden in the protector. In another assembly shown in the Japanese Unexamined Patent Publication No. 1-212561, an indwelling needle is combined with a protector having wings. Due to a positioning mechanism intervening between the needle and the protector, the latter can forwardly slide toward the former so that a needle edge is enclosed not to injure the user.

The wings integral with needle body shown in the USP No. 5,120,320 are secured to a patient's skin, by means of an adhesive tape or the like. Such an indwelling needle cannot be retracted in situ into the protector, unless the tape is torn off and the needle is withdrawn from the patient's skin. Further, the needle body shown in the Publication No. 1-212561 often moves backward relative to the protector, due to a resistance of the skin being pricked with the needle. There is another problem that the needle body tends to slip off, when it is manually pulled backward to retract the needle edge into the protector.

## SUMMARY OF THE INVENTION

Therefore, an object of the present invention is to provide an indwelling injector needle assembly which comprises a needle body operable to simply slide back into a protector so that a needle edge can surely be retained in the protector having wings. Another object is to provide a needle assembly designed such that a needle edge can be retracted into a protector while its wings remain fixed to a patient's skin.

According to the present invention, an indwelling injector needle assembly having wings is provided, the assembly comprising: a needle body to which a tubing is connected; a cylindrical holder from which the wings protrude; the needle body being slidable relative to the holder between a first position where the needle body protrudes forward a distance from a distal end of the holder and a second position where the needle body is entirely retracted in the holder; a latching mechanism provided in and between the holder and a hub supporting the needle body such that the needle body is inhibited from being displaced from the first position toward the second position, and vice versa; a guide groove and an auxiliary groove formed in a peripheral wall of the hub; the grooves being located side by side and longitudinally of said hub, wherein a distal end of the auxiliary groove terminates at a distal end of the hub; the auxiliary groove having a proximal end communicating with the guide groove; and a lug formed integral with and protruding inwardly from an inner periphery of a proximal end of the holder, wherein the lug of the holder engages with and is slidable fore and aft in the guide groove.

The latching mechanism may comprise a first locking means for holding the hub at the first position, and a second locking means for holding said hub at the second position. It will be apparent from the comparison of Fig. 3 with Fig. 4 and from the description given hereinafter that the first and second locking means are disposed at different angular positions around the axis of the hub. Those members constituting the locking means will be detailed below.

When a patient's skin is pricked with the needle edge, the needle body will be at its first position relative to the cylindrical holder. The latching mechanism is effective to surely retain the needle hub in this state lest the resistance of the skin being pricked will displace said hub towards the second position, that is towards its proximal end. After a medical treatment using this assembly finishes, a cannula ( that is the needle body ) will be retracted into the holder to take the second position where the needle edge is hidden in said holder. The latching mechanism also serves to inhibit the

hub from forwardly moving towards the first position, that is towards its distal end, unless forcibly urged. Further, the needle hub is also prevented from moving backward beyond its second position, so that the needle body will never slip off the holder.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view of an injector needle assembly having wings, provided in an embodiment;

Fig. 2 is a front elevation of the assembly shown in Fig. 1;

Fig. 3 is a cross section taken along the line X - X in Fig. 1;

Fig. 4 is a plan view of the assembly shown in Fig. 1 and partly in cross section, with a needle end of the assembly being retracted in a holder;

Fig. 5 is a cross section taken along the line Y - Y in Fig. 4;

Fig. 6 illustrates the first step of forming the assembly;

Fig. 7 illustrates the succeeding step of forming said assembly; and

Fig. 8 is a plan view of another assembly provided in another embodiment and shown partly in cross section.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the present invention will now be described referring to the drawings.

As shown in Figs. 1 - 8, an injector needle assembly having wings provided in a first embodiment comprises a needle 1 having a tubing 3 connected thereto, and a cylindrical holder 2 having the wings 4 integral therewith. The needle 1 is slidable within the holder 2 between a first position where the needle protrudes forward a distance from a distal end of the holder and a second position where the needle is retracted into the holder. A latching mechanism is provided in and between a hub 12 of the needle 1 and the holder, in a manner such that the needle is inhibited from being displaced from the first position toward the second position, or vice versa. A guide groove 13 and an auxiliary groove 14 are formed in a peripheral wall of the hub 12, and located side by side and longitudinally of said hub. A distal end of the auxiliary groove 14 extends to and opens at a distal end of the holder 2, and a proximal end of the auxiliary groove communicates with the guide groove 13. A lug 21 is integral with an inner periphery of a proximal end of the holder 4. This lug 21 engages with and is slidable fore and aft in the guide groove 13.

A cannula 11, viz. a hollow main body of the injector needle 1, is made for example of a metal such as a stainless steel ( preferably SUS-304 ) and has at its distal end a pricking edge. A proximal end of the cannula is connected to and held by a distal end of the hub 12. This hub 12 having the guide groove 13 and the auxiliary groove 14 formed therein is usually made of a flexible resin such as a polypropylene, a polyester and a polyethylene. The distal end of the auxiliary groove 14 extends to and opens at the distal end of the holder 2, and the proximal end of the auxiliary groove communicates with the guide groove 13. A distal closed end of the guide groove 13 is formed as a recess 15, and this groove 13 extends therefrom towards its proximal end. The recess 15 will engage with the lug 21 of the holder 2, when the needle 1 is retracted to the second position relative to the holder 2. A tubing 3 is connected to the proximal end of the hub 12, which has usually two arms 16 disposed symmetrically and side by side. Alternatively, only one such arm may suffice. Each arm 16, which extends forwardly towards the distal end of said hub from a proximal end portion of thereof so as to be disposed behind the guide groove 13, may be shaped as shown in Fig. 4. A distal end of this arm is a hook 161 and a slit 163 intervenes between each arm and a central columnar portion 162. Those slits 163 allow the arms to flex easily and inwardly, because the hub 12 is made of the flexible material as mentioned above. Each hook 161 has a generally U-shaped recess 164 as shown in Figs. 1 and 4. The hook is engageable with an aperture 22 and disengageable therefrom by flexing the arms 13 towards each other. Alternatively, each arm 16 may have a distal end of a spherically convex shape ( as shown in Fig. 8 ) protruding outwardly of the hub so that a thin portion 165 is provided between the distal end and a proximal end of said each arm. In this case, each hook 161 may readily be disengaged from a corresponding shallow recess 23 formed in the proximal end of the holder 2, by simply pulling the hub 12 away from the holder. The number of said apertures 22 or recesses 23 may be the same as the number of the arms 16.

The auxiliary groove 14, useful when assembling this injector needle unit, extends to and opens forwardly at the distal end of the hub 12, lest the lug 21 formed at the proximal end of the cylindrical holder 2 should hinder the hub from being inserted therein. Thanks to this feature, the lug 21 is allowed to slide along the auxiliary groove 14, until the hub is completely received in the holder 2. The lug 21 will then be transferred into the guide groove 13, because the latter communicates with the auxiliary groove. A first step of assembling this injector needle unit having the



wings is shown in Fig. 6. At this step, the lug 21 of the holder 2 will be caused to slide in and along the auxiliary groove 14 until bearing against the proximal end thereof so that the hub 12 is fully inserted in the holder, as will be already apparent. The holder 2 will then be rotated in a direction indicated at the arrow in Fig. 7 showing a succeeding step of the assembling work. The lug 21 will thus transfer from the auxiliary groove 14 to the guide groove 13 communicating therewith through a transverse passage 17. Subsequent to this step, the cylindrical holder 2 will be moved towards its proximal end so that its lug 21 now slides in the guide groove 13, until abutting the proximal end thereof and simultaneously causing each arm's hook 161 of the hub to fit in the corresponding aperture 22.

The holder 2 is a cylindrical member for accommodating the hub 12, and the wings 4 integrally protruding sideways from the distal end portion of said holder are flexible. The hub 12 is slidable within the holder and along an inner periphery thereof, between the first position and the second position. As already mentioned above, the cannula will protrude a distance from the distal end of said holder 2 at the first position, whilst an extremity of said cannula is retracted therein at the second position. The lug 21 engageable with the recess 15 formed in the hub 12 protrudes inwardly from the inner periphery of the proximal end portion of said holder, as shown in Figs. 3 and 5 to 7. The lug 21 fitted in the guide groove 13 of the hub 12 is slidable only between the proximal and distal ends of said groove. Each aperture 22 engageable with the corresponding arm's hook 161 is formed through a portion of the peripheral wall of the holder, this portion being located nearer the proximal end of holder than the lug 21. In a case wherein the hook 161 comprises a spherically convex end as shown in Fig. 8, the shallow recesses 23 may substitute for the apertures 22, at the same holder portions as the latter are located. The reference numeral 24 denotes a slit that facilitates the outward flexing of the holder portion where the lug 21 is formed. Such a slit will help this lug smoothly enter the auxiliary groove 14 and smoothly travel along the guide groove 13.

In use, the hub 12 of the described needle assembly having the wings will take an indwelling position relative to the holder 2 as shown in Fig. 1. This position is the first position described above, in which the cannula's distal end protrudes from the holder 2 and the arms 16 ( viz. their hooks 161 ) are in engagement with the respective apertures 22 ( or shallow recesses 23 ). These members or elements 16 and 22 ( or 23 ) constitute the first latching means which prevents the hub 12 from moving relative to and towards the proximal end of

said holder 2, when pricking the patient's skin with the needle end.

After use, the user need to grip with his or her fingers the arms 16 of the injector needle assembly shown in Fig. 1 so that the arms flex inwards to be disengaged from the apertures 22. He or she gripping the arms will then move the hub 12 rearwardly towards its proximal end. The lug 21 of the cylindrical holder is displaced in this manner along the guide groove 13, from the first position to the second position, until engaging with the recess 15 located at distal end of said groove. Thus, the lug 21 cooperates with the recess 15 to provide the second locking means for this injector needle assembly. The hub is thus locked at the second position where the pricking edge of cannula 11 is completely retracted in the holder. If the assembly is of a modified structure as shown in Fig. 8, then the arms 16 will likewise be gripped at first. However, the simple backward pulling of the hub 12 will cause the hooks 161 to flex inwards so that the lug 21 disengages from the shallow recess 23. This motion will similarly be followed by the displacement of said lug from the first position to the second position where the hub is locked also by the lug 21 engaging with the recess 15 and the pricking edge of cannula 11 is completely retracted in the holder.

It will now be apparent that the injector needle assembly having the wings and provided herein is effective to protect those who are engaged in medical treatments and/or operations from erroneously pricking their skins with needle edges. It is further advantageous that the present assembly whose hub need only be displaced within the cylindrical holder towards the proximal end thereof to enclose the needle edges can be used more easily than the prior art assemblies whose wings have to be removed before removing the needle bodies.

## Claims

1. An indwelling injector needle assembly having wings, the assembly comprising:
  - a needle body to which a tubing is connected;
  - a cylindrical holder from which the wings protrude;
  - the needle body being slidable relative to the holder between a first position where the needle body protrudes forward a distance from a distal end of the holder and a second position where the needle body is entirely retracted in the holder;
  - a latching mechanism provided in and between the holder and a hub supporting the needle body such that the needle body is inhibited from being displaced from the first

position toward the second position, and vice versa;

a guide groove and an auxiliary groove formed in a peripheral wall of the hub;

the grooves being located side by side and longitudinally of said hub, and the auxiliary groove having a distal end terminating at a distal end of the hub;

the auxiliary groove having a proximal end communicating with the guide groove; and

a lug formed integral with and protruding inwardly from an inner periphery of a proximal end of the holder, wherein the lug of the holder engages with and is slidable fore and aft in the guide groove.

2. An indwelling injector needle assembly as defined in claim 1, wherein the latching mechanism comprises a first locking means for holding the hub at the first position, and a second locking means for holding the hub at the second position.

3. An indwelling injector needle assembly as defined in claim 2, wherein the hub is of a flexibility, the first locking means comprises at least one arm and at least one aperture, the arm being a member integral with the hub and disposed at a proximal side of the guide groove, and the aperture formed through a peripheral wall of the holder is also disposed at a proximal side of the lug, and wherein the arm having a hook capable of engaging with the aperture and formed integral with a distal and outer end surface is flexible inwards due to the flexibility of the hub so as to cause the hook to be disengaged from the aperture.

4. An indwelling injector needle assembly as defined in claim 2, wherein the hub is of a flexibility, the first locking means comprises at least one arm and at least one shallow recess, the arm being a member integral with the hub and disposed at a proximal side of the guide groove, the arm having an outwardly protruding convex end engageable with the shallow recess, and the shallow recess formed in a peripheral wall of the holder is disposed at a proximal side of the lug, and wherein the arm having the convex end capable of engaging the shallow recess and formed integral with a distal and outer end surface of the arm is flexible inwards due to the flexibility of the hub so as to cause the convex end to be disengaged from the shallow recess.

5. An indwelling injector needle assembly as defined in claim 3 or 4, wherein the second

locking means comprises the hub and a recess formed in the guide groove and at a distal end thereof, so that the hub is capable of engaging with the recess formed in the guide groove when the hub is retracted towards the tubing.

FIG. 1

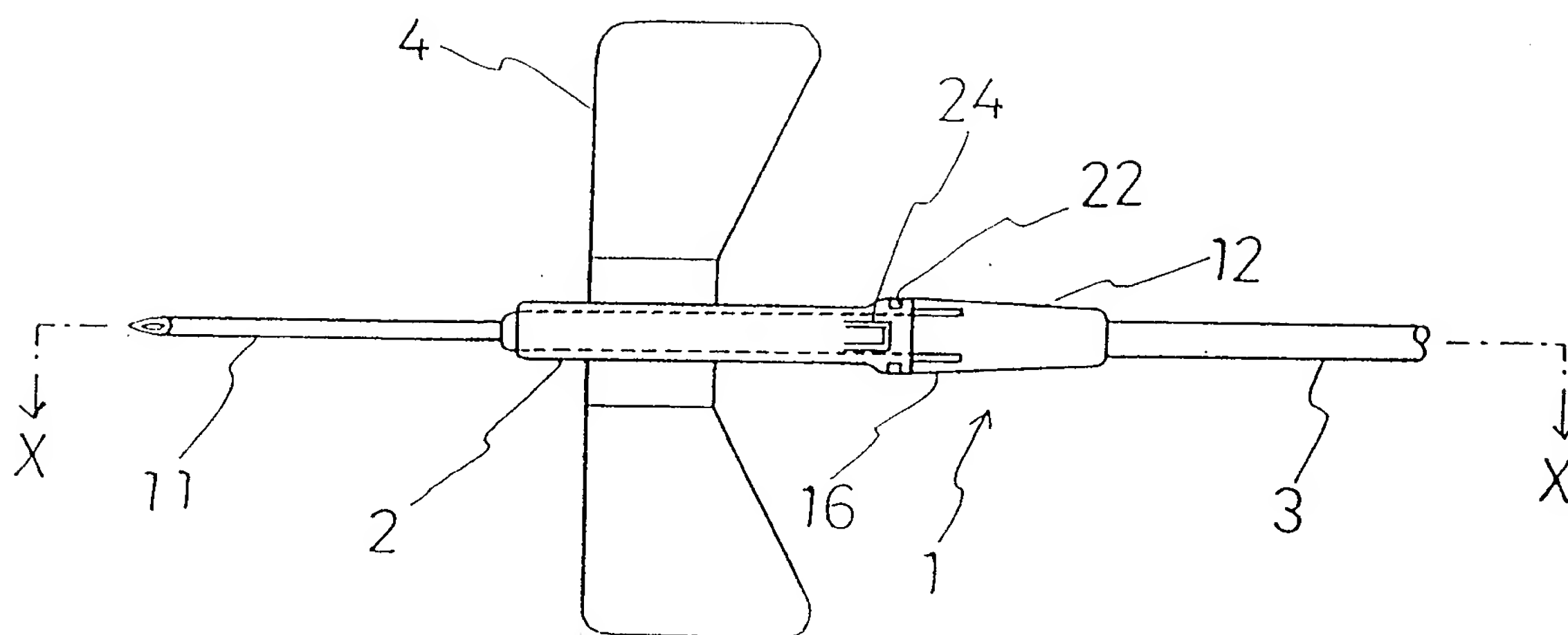


FIG. 2

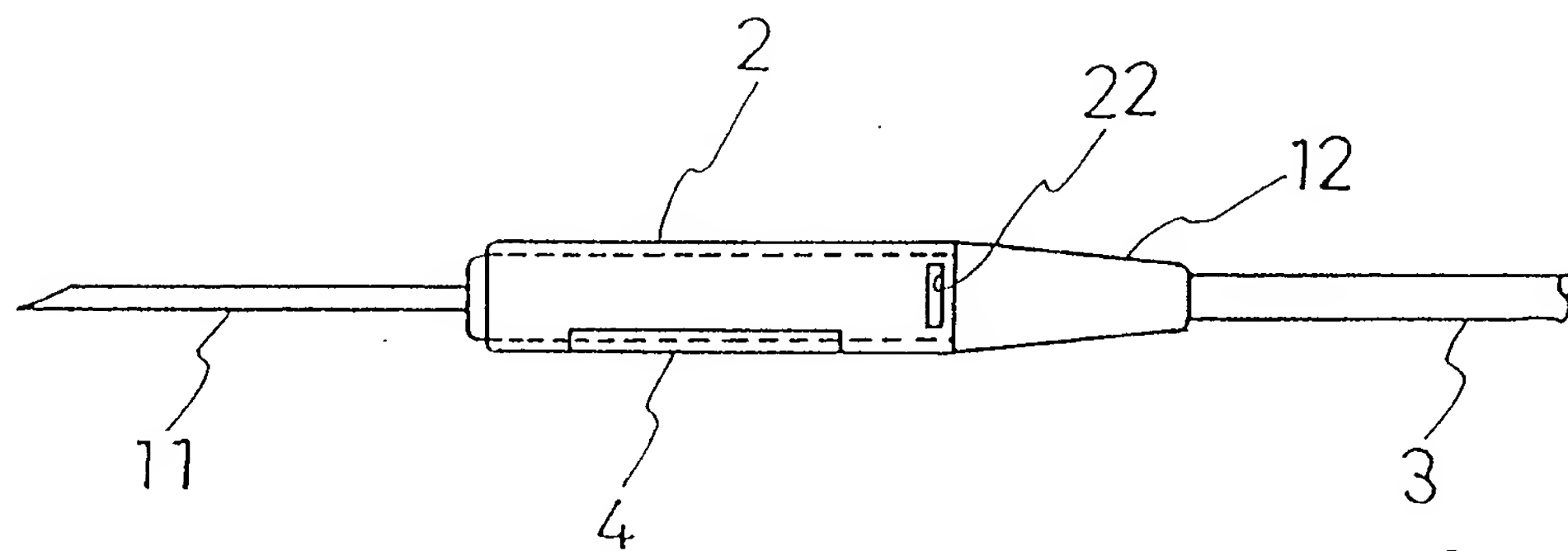


FIG. 3

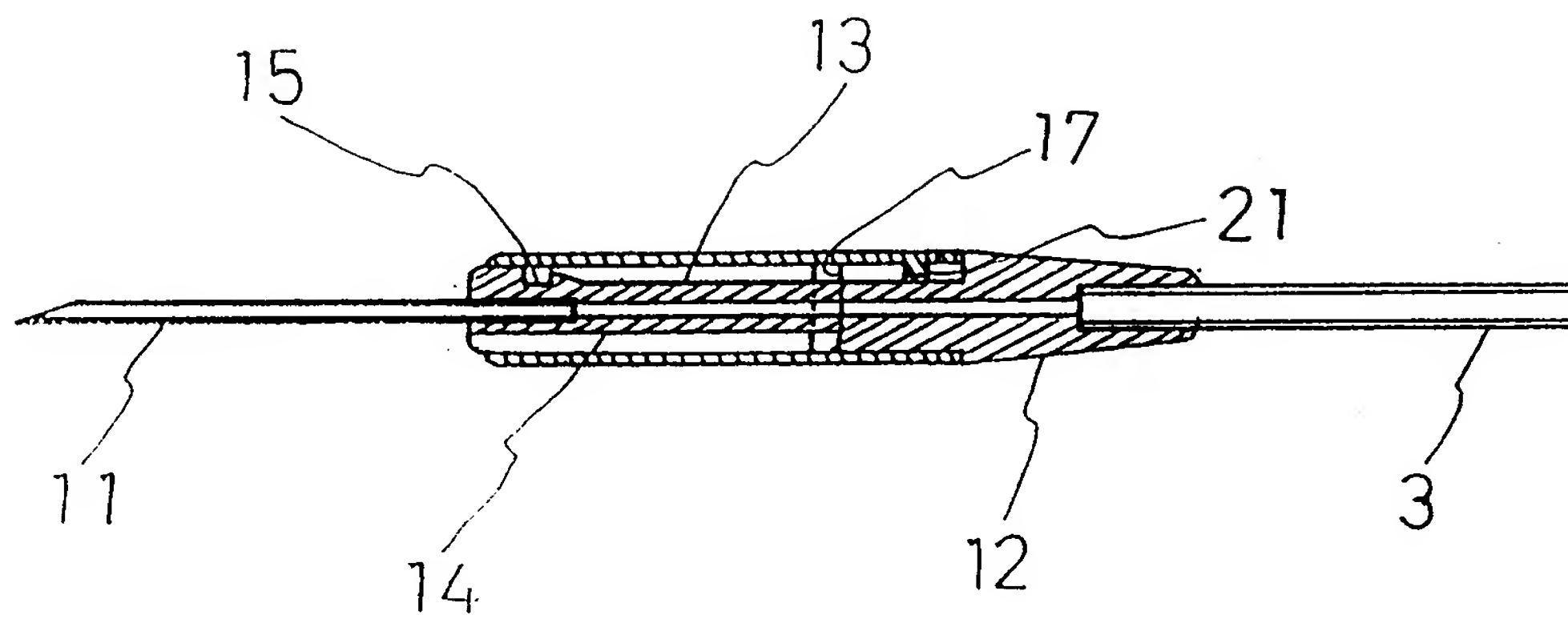


FIG. 4

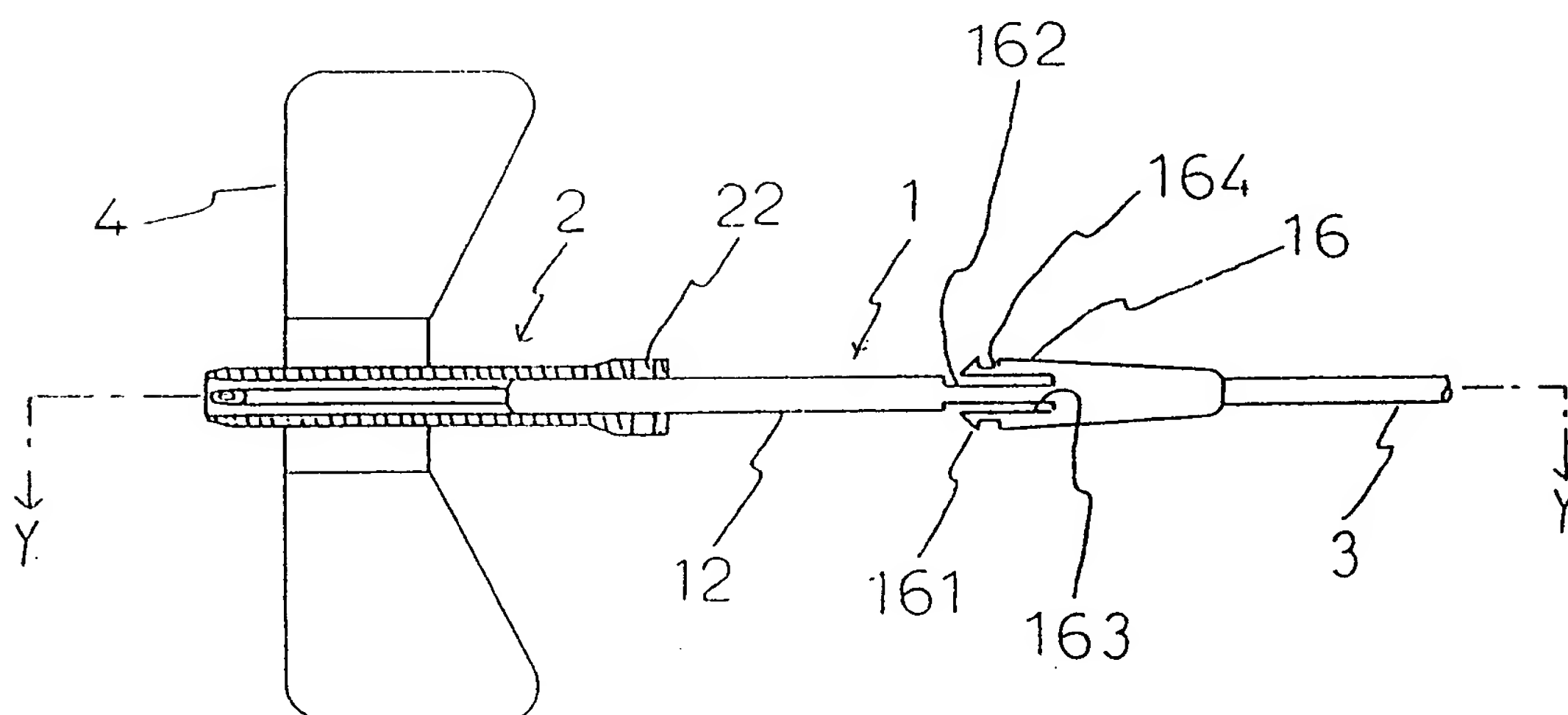


FIG.5

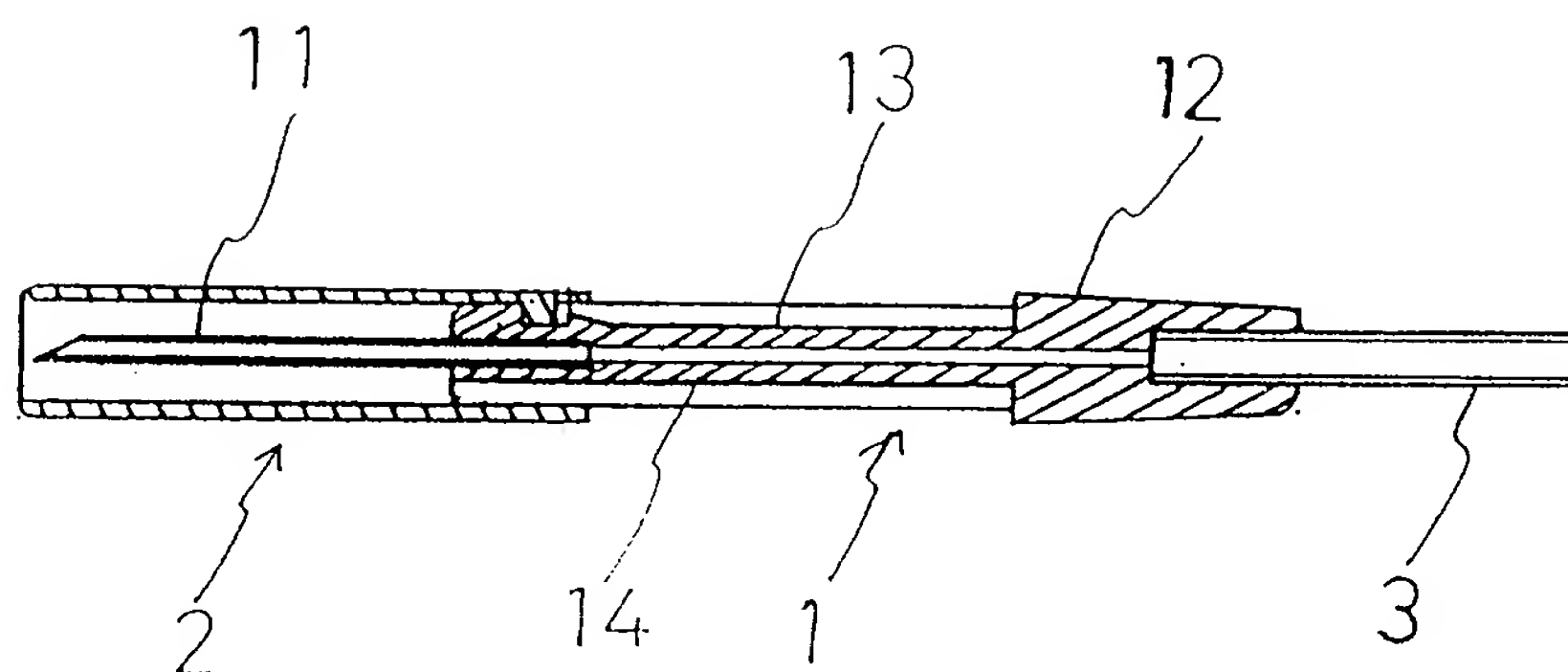


FIG.6

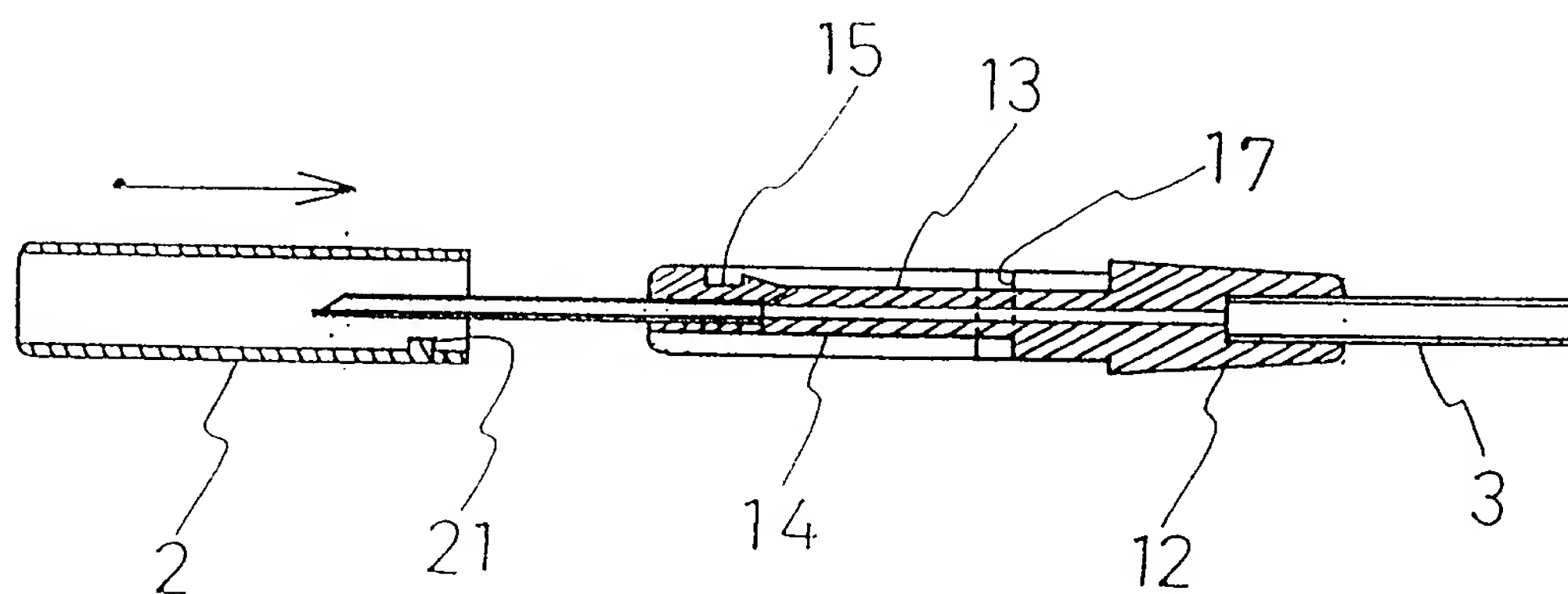


FIG.7

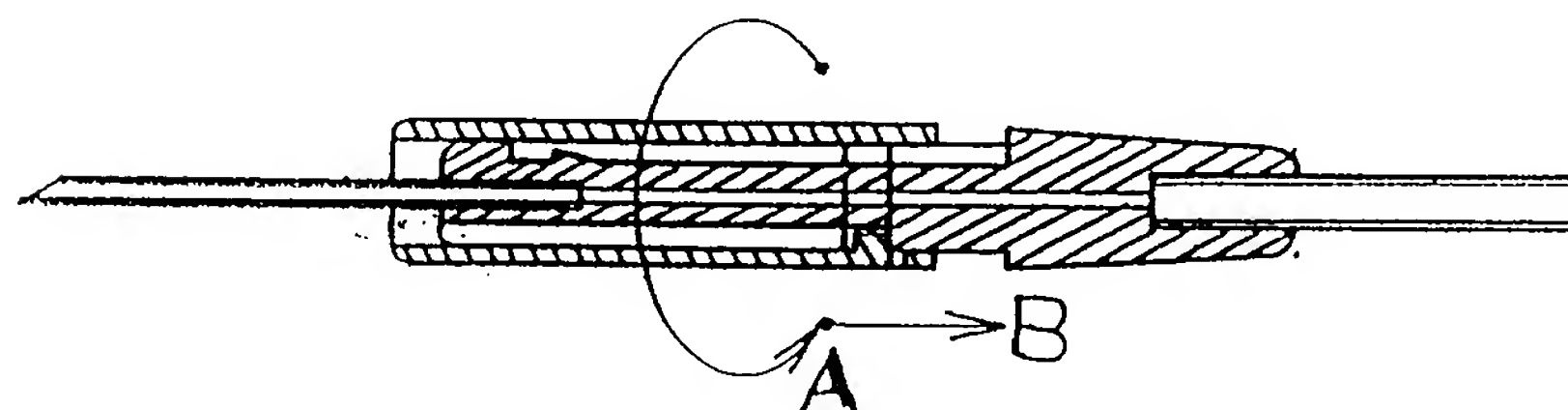
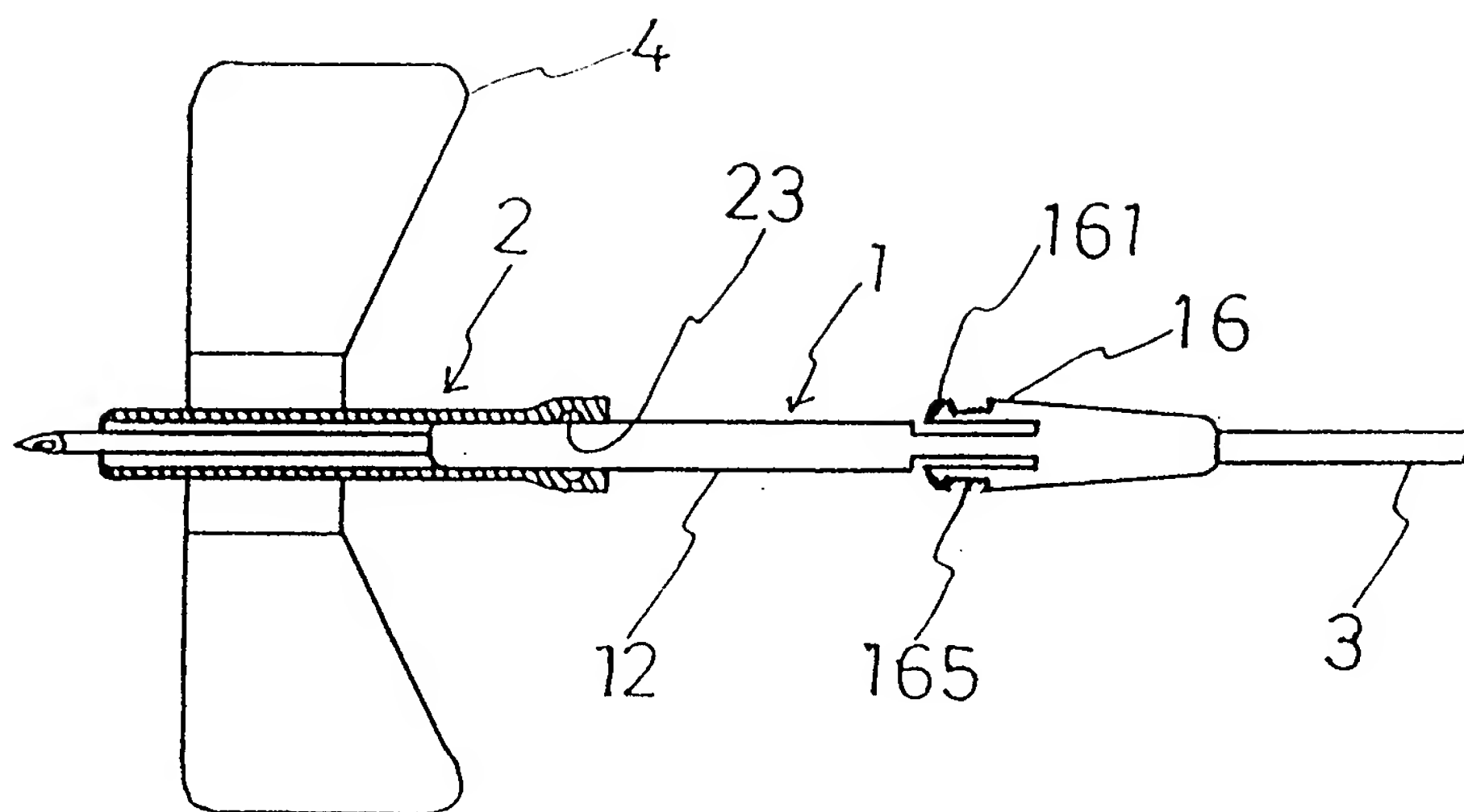




FIG. 8





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## EUROPEAN SEARCH REPORT

Application Number  
EP 95 10 0548

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP-A-0 550 949 (UNIVERSITY OF FLORIDA) * abstract; figures 1,2,5,6 * ---	1-5	A61M25/06
A	DE-U-93 11 765 (VIGGO-SPECTRAMED AB) * figures 1-4 * ---	1-5	
A	EP-A-0 339 812 (MENLO CARE INC.) * abstract; figure 1 * ---	1-5	
A	EP-A-0 566 769 (INTERNATIONAL SAFTYJECT INDUSTRIES, INC.) * abstract; figures 1-3 * -----	1-5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A61M
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 April 1995	Examiner Michels, N
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			